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# **Categorizing and Defining Popular Psychological Terms Used Within the Youth Athlete Talent Development Literature: A Systematic Review**

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### **Abstract**

Inconsistencies in the use and definition of psychological terms within the talent development literature have been identified. To advance the scientific field, the creation of a shared language is recommended. This review aimed to systematically (i) identify terms used in empirical studies to describe psychological components purported to facilitate athletes' development; (ii) analyse definition and meanings of these terms; and (iii) group, label and define terms into meaning clusters. A systematic review using a narrative approach to synthesise information was conducted. A comprehensive literature search of SPORTDiscus, PsycINFO, PsycARTICLES, and ERIC was completed in May 2015. In total 21 empirical studies, published between 2002 and 2015, met the inclusion criteria and were included in the narrative synthesis. Thematic analysis was used to analyse the findings. Identified psychological terms were categorised as psychological skills or psychological characteristics. Psychological skills were defined as athletes' ability to use learned psychological strategies (e.g., self-talk) to regulate and facilitate the enhancement of psychological characteristics. Psychological characteristics were defined as predispositions that impact upon athlete development (e.g., self-confidence). Despite being relatively enduring and consistent across a range of situations, psychological characteristics can be regulated and enhanced through the use of psychological skills.

**Keywords:** talent identification, mental skills, sport psychology, youth sport, definitions

## **Language games in sport psychology**

An increasing amount of research has attested to the importance of psychological components<sup>1</sup> in the successful development of talented youth athletes (e.g., Gould, Diffenbach, & Moffet, 2002; Harwood, 2008; MacNamara, Button, & Collins, 2010a; 2010b). Within this evidence base a host of psychological components - such as motivation, self-confidence or imagery – have been found to play a crucial role in allowing young talented athletes to fulfil their potential and deal with the inevitable hurdles of talent development (e.g., Durand-Bush & Salmela, 2002; Larsen, 2013). Nevertheless, in relation to the specific psychological components that facilitate young athletes' development, opinions differ. For example, Harwood (2008) deemed commitment, communication, concentration, control, and confidence as particularly important for youth football players' development. In comparison, MacNamara et al. (2010a & b) identified commitment, coping with pressure, a vision of what it takes to succeed, imagery, focus, distraction control, social skills, goal setting, realistic performance evaluation, competitiveness, and game awareness as the most facilitative psychological components for developing athletes. Despite this being a brief insight into the various ways psychological components have been conceptualized, it indicates conceptual ambiguity. One reason for this conceptual ambiguity could be that the research referred to above has been conducted in various performance domains, as well as with athletes from varying ages and stages of development (MacNamara & Collins, 2015). Nevertheless, to establish more clarity around this issue, the original purpose of this paper was to identify, analyse and summarise psychological components that are perceived to facilitate talented athletes' development. However, in conducting the systematic research process to address this issue, strong inconsistencies in the psychological terminology used within the talent development literature were revealed. Therefore, it was deemed necessary to take a step back and examine the content of the included articles from a terminological perspective before any trustworthy conclusion could be reached. Taking a terminological standpoint, it became apparent that critics have already argued that progress in this area of research has been curtailed by the confusion and ambiguity that exists in the language used in the literature (c.f., Danish, Taylor, Hodge, &

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<sup>1</sup> Within this review the words 'psychological components' will function as an umbrella term that represent the psychological terms that have been used synonymously within the talent development literature (e.g. psychological characteristics, methods, skills, qualities) until definitions are established.

Heke, 2004; Gould & Carson, 2008; Johnston, Harwood, & Minniti, 2013; Lindsay, Pitt, & Thomas, 2014; Swann, Moran, & Piggott, 2015). For example, Lindsay et al. (2014) stated that ‘...our discipline frequently suffers with conceptual confusion and misunderstanding driven by our unintentional misguided use of language’ (p. 42). Further, Lindsay et al. (2014) suggest that a common shortcoming of our discipline is a lack of agreed definitions and conceptual clarity. In the context of talent development, this lack of agreed definitions is readily visible and seemingly accepted in various introductory narratives (e.g., Larsen, Alfermann, & Christensen, 2012).

Although this definitional issue has been recognised, it is only recently that researchers have addressed this issue by creating guidelines for the ‘language games’<sup>2</sup> that are being played. One such example is Swann et al. (2015), who identified considerable inconsistencies in the definition of elite or expert athletes. It was suggested that imprecision in the criteria used to define ‘expert’ or ‘elite’ performers could skew conclusions about the nature of psychological expertise in sport. Against this background, Swann et al. (2015) systematically evaluated available literature and created guidelines that help researchers to define athletes’ level of ‘expertise’ with greater transparency. Similarly, Gould and Carson (2008) critiqued literature that investigated life skills development through sport. They argue that ‘one problem plaguing life skills through sport research stems from the fact that life skills and associated terms are often not precisely defined’ (p. 59). Furthermore, Gould and Carson (2008) argued that terms such as ‘positive youth development’, ‘social-emotional growth’ and ‘life skills development’ were often used interchangeably with little or no explanation, while a common understanding of terms was suggested to be assumed. In relation to the term ‘positive youth development’ (PYD), Johnston et al. (2013) highlighted that despite researchers’ efforts to define the important components of PYD, a variety of terms were used to describe seemingly similar, but slightly differing models of PYD. Such behaviour was said to impede the readers’ ability to effectively compare studies and understand the psychological components that underpin PYD. This situation leads to difficulties, both in research (Gould & Carson, 2008) and program design (Danish et al., 2004).

Moving beyond the talent development literature to general sport psychological literature, a need to define different categories of psychological terms was identified by Vealey

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<sup>2</sup> The term ‘language games’ is taken from Wittgenstein’s famous text (1958) wherein he diagnoses the problems of philosophy as deriving from linguistic confusions. Wittgenstein asserts that these ‘language games’ are not being played intentionally, they are an unavoidable aspect of human behaviour.

nearly three decades ago (Vealey, 1988). This realisation emerged when content analysing 27 books published in North America between 1980 and 1988, with the aim to systematically examine the content of psychological skills training approaches in relation to target populations, content areas, and format characteristics. Almost as a by-product of this process, Vealey addressed the need to differentiate between psychological skills and methods. Thereby she defined psychological skills as “qualities to be attained, as opposed to methods which are procedures or techniques athletes engage in to develop skills” (p. 326). Unfortunately, the process that has led to these definitions appears indiscriminate. No insight is given as to why the terms skills and methods were chosen over other terms such as procedures or techniques and what has led to the conclusion that psychological methods facilitate the development of psychological skills. Engaging in a rigorous and evidence based analysis of similar terms in the talent development literature therefore seemed justified.

### **Language games in developmental and general psychology**

The absence of shared rules for language games has also been identified in the broader psychological literature (e.g., Reber, 1995; Lourenco, 2001; Racine & Müller, 2009). Lourenco (2001) identified three main fallacies frequently committed: (a) the use of un- or ill-defined words, (b) a lack of insight into what distinguishes terms from or connects terms with each other, and (c) the use of ordinary words in special senses. The first fallacy was described by Lourenco (2001) as individuals' use of “obscure, bizarre, vague, or under-defined terms” (p. 91). Buzzwords such as ‘mindset’ (Dweck, 2008) or ‘mental toughness’ (Clough, Earle, & Sewell, 2002) are popular examples. A ‘literal interpretation of these concepts’ argues Lourenco (2001) “yields gibberish ... and the illusion that something deep and rigorous was said merely by using a homonym of a term” (p. 91). Instead of being cognisant that these descriptive metaphors are often only simplistic generalisations, there is a danger that these terms may be misunderstood and used out of context (e.g., by coaches, the media, & practitioners). Reber (1995) made a similar observation, arguing that the lack of definitions frequently leads to authors using key terms too freely in core texts. The second fallacy occurs when authors fail to distinguish between similar concepts or explain relationships between them (Lourenco, 2001). Terms such as psychological characteristics, attributes, subcomponents or skills (c.f., Butt, Weinberg, & Clup, 2010) are common examples. The third and final fallacy occurs when individuals use “an ordinary word as a technical term without giving a precise definition and relevant examples” (Lourenco, 2010, p. 105). This behaviour

can lead authors, researchers and readers to assume a shared understanding, but actually lead to confusion and misinterpretation of literature and results.

### **A philosophical diagnosis and tentative solution**

Debate about progress in research and what curtails advancement has been taken up in the wider philosophical literature. These debates add value and give insight into seemingly unintentional language games played in other research areas. Therefore, the analysis of the situation – its diagnosis and potential remedy – within the talent development literature will draw upon work by arguably the three most influential philosophers of the last century.

*The Kuhnian Perspective.* In his classic text, *The Structure of Scientific Revolutions*, Thomas Kuhn (1962) described what scientists do and characterised their activity as ‘puzzle solving’ within ‘paradigms’. Paradigms are exemplars for research, containing common assumptions, theories and methods that are held to be sacrosanct by a scientific community. He labelled this type of activity ‘normal science’ as his studies showed that this was the dominant mode of science in physics, chemistry and astronomy. According to Kuhn’s account, activity in a paradigm is inherently dogmatic since no criticism is tolerated from within or without. Also, since paradigms are ‘incommensurable’ – i.e. they are researchers’ ways of seeing the world – there is limited possibility of sensible debate between researchers from different paradigms (Feyerabend, 1975). Considering the talent development literature, it appears that several paradigms such as mental toughness, life skills, mindset, psychological characteristics of developing excellence, or self-regulatory skills, exist. A Kuhnian analysis suggests that this situation is ‘normal’ - even inevitable - and will only change with infrequent revolutionary leaps after the build-up of an intolerable number of anomalies. From a Kuhnian perspective, progress in research is defined by a deepening or extending of a paradigm into new territory. This is often achieved through the development of more precise tools allowing for more detailed and exhaustive analysis. A Kuhnian may argue, therefore, that the situation in talent development research is ‘normal’ and reflective of progress (i.e. as new psychometric instruments are developed). However, in line with the Wittgensteinian and Popperian perspectives, we would challenge this vision of science.

*The Wittgensteinian Perspective.* One of the key philosophers from whom Kuhn drew inspiration was Ludwig Wittgenstein. In a similar yet more specific analysis, Wittgenstein argued that all philosophical problems are rooted in the misuse and misunderstanding of language. He suggested that as long as communities played language games, no progress could

be made (Wittgenstein, 1958). Wittgenstein “spent much of his life in an effort to eradicate traditional philosophy by clearing the verbal confusion on which he said it rests” (Agassi, 2014, p. 93). From a Wittgensteinian perspective, then, the only way out of language games lies in the exhaustive analysis of language and establishing clear definitions that are shared by all. The Wittgensteinian solution to the problem addressed within this review therefore requires the development of irrefutable and unambiguous definitions, shared by the whole research community. Such a solution is unlikely in this context (especially if researchers operate as Kuhn suggested) and is at any rate hard to defend since all definitions rely on words that also need to be defined, leading to an unsatisfactory infinite regress (Popper, 1962).

*The Popperian Perspective.* Another normative solution was offered by Popper, who argued that definitions were only important insofar as they helped in establishing clear research problems and hypotheses (Popper, 1962). What they do not offer is the ‘real’ or ideal outcome. He argues that “we are misled by the theory of Aristotle that says, definitions are certain and provide true knowledge of the real world” (Agassi, 2014). Popper’s alternative view – which describes science at its best, and presents best practice guidelines – is sometimes called ‘critical rationalism’, where researchers put forth bold theories (rationalism) that are then subject to empirical testing and attempted refutation (critical). Contrary to Kuhn, Popper (1978, p. 38) argued that “the scientific attitude was the critical attitude, which did not look for verification, but for crucial test”. To address this need, theories and the problems they purport to solve need to be clearly formulated if they are to be testable (Magee, 1973). In relation to this review, the Popperian approach highlights the need for conceptual clarity in the formulation of tentative theories about different categories of terms and the relationships between them. The Popperian solution to the problem identified in this review, in keeping with the ideas of Lindsay et al. (2014) and Gould and Carson (2008), is arguably the most pragmatic and positive way forward.

### **Applying a Popperian analysis to the talent development literature**

Taking a Popperian standpoint this review aims to address urgent calls for clarity in the talent development literature (e.g., Danish et al., 2004; Gould and Carlson, 2008; Lindsay et al., 2014). More specially, three core aims are addressed. Firstly, to identify the terms used that describe the psychological components perceived to facilitate the development of talented athletes to elite performers. Secondly, to locate and analyse the definitions and descriptions of the terms used in order to identify consistencies and inconsistencies. Thirdly, to group, label and define any clustered psychological terms.



In short, we aimed to clarify the problems and solutions identified in the literature in order to create a bold and purposeful (but necessarily fallible) theory that can be tested, critiqued and improved upon through critical debate and further research. Put another way, we aim to advance the talent development field by surveying the literature and offering a critical conceptual analysis.

## **Method**

### **Development of search strategy**

This review employed conventional systematic review principles to ensure the rigorous selection of literature based on replicable criteria (Smith, 2010). A list of key words relevant to the research aims was created (Smith, 2010) and these search parameters were trialled in a preliminary search on the SPORTDiscus database. The search results were sampled, whereby every 10th result was assessed for relevance and analysed for additional keywords that were most frequently used within the literature (Weed, Coren, & Fiore, 2009). This process was repeated until the most effective search terms were identified (i.e., the terms that returned the most relevant and specific literature in relation to the research question). Irrelevant terms that repeatedly came up in the search results were excluded (i.e., disorder). The final list of search terms included the following:

(‘psychological characteristic\*’ OR ‘mental skill\*’ OR ‘psychological skill\*’ OR ‘mindset’)  
AND  
(elite OR success\* OR excellen\* OR perform\*)  
AND  
develop\*  
AND  
(young OR athlet\*)  
NOT  
disorder

Relevant databases namely SPORTDiscus, PsycINFO, PsycARTICLES, and ERIC were searched. In addition, reference lists of studies included within this review were hand searched for relevant papers that may have been missed during the search (Swann, et al., 2015).

### **Inclusion/exclusion criteria**

Inclusion and exclusion criteria were employed to create clearly defined boundaries for the review (Smith, 2010). The inclusion criteria were, (a) peer reviewed research studies, (b) published in English language only, (c) published from January 2002 (when the first relevant study in relation to the research purpose could be identified) until May 2015 (when the formal search was finalised), (d) have gathered original qualitative or quantitative evidence on psychological components that facilitate young (under 18 years of age) talented athletes' development, (e) involve sporting activities as defined by the Oxford Dictionary of Sport Science and Medicine (Kent, 2006), (f) contain specific reference to either psychological/mental characteristics, psychological/mental skills, psychological/mental qualities, psychological/mental attributes, psychological/mental techniques, psychological/mental factors, psychosocial characteristics, mindset or life skills within the title or abstract, and (g) include data that was compatible and relevant to the three core aims of this study.

### **Search returns**

The search process came to a close on the 1st of May 2015 and retrieved 183 potentially relevant hits. Duplications were removed and abstracts and titles assessed for relevance. Based on the inclusion/exclusion criteria, 149 papers were excluded and 34 papers kept for full-text retrieval. Most studies were excluded due to their focus on senior (above 18 years of age) elite athletes. An additional nine papers were added after hand searching the reference lists of the 34 included papers. After full-text retrieval and review, 18 of the 43 papers met the inclusion criteria. This reference list was examined by an experienced external advisory team. Suggestions from this advisory team regarding additional references were considered and 12 papers accessed and reviewed. Following this process an additional three references were added. Hence 21 studies met the inclusion criteria and were analysed for the purpose of this review. Following the PRISMA flow diagram guidelines developed by Moher, Liberati, Tetzlaff and Altman (2009), a detailed overview of the search process, along with the reasons why papers were rejected, can be found in Figure 1.

**Insert Figure 1 here**

### **Data synthesis**

The aim of the data synthesis was to identify and elicit terms used to describe psychological components perceived to facilitate the development of talented athletes, and to locate and

analyse the definitions and descriptions of these terms within the reviewed literature. In this instance, the word “data” therefore refers to psychological terms and their explicit or implicit definitions expressed within each paper. In order to allow full immersion in the data, the lead author read the 21 papers three times (Maykut & Morehouse, 1994). After familiarity was established, she then went through an extensive process of extracting data and re-reading the literature to ensure accuracy and comprehensiveness (Glasziou, Irwig, Bain, & Colditz, 2001). Inductive thematic analysis was used to extract key information from the data (Pope, Mays, & Popay, 2007). As this review aimed to bring clarity to the psychological terms used within the talent development literature, and the majority of findings were derived qualitatively, a narrative synthesis approach was deemed appropriate. This “relies primarily on the use of words and text to summarise and explain the findings of multiple studies...(and) where evidence allows, it can also involve some element of integration and/or interpretation” (Pope et al., 2007, p.102). As stated above, the narrative synthesis process involves extracting words and text deemed to give insight into the research questions from the included studies (Popay, Roberts, Sowden, et al., 2006). To do this several steps were followed, as recommended by Arai, Britten, Popay, et al. (2007) and Rodgers, Sowden, Petticrew, et al. (2009). These steps led to different types of data being extracted from the reviewed papers, which in turn were presented in tabular form (Table 1). Specifically, the first column in Table 1 lists the 17 different psychological terms that were identified in the reviewed papers. The second and third columns detail how many - and which - studies used the terms outlined in first column. This data is presented to identify the frequency with which different psychological terms are used in the field; giving insight into the popularity of terms and the paradigms researchers work in. The fourth column contains text phrases that authors used to define or explain the terms outlined in the first column. These phrases were grouped and clustered in relation to the appropriate terms. The final column offers specific examples given by the authors for each psychological term. Through focusing on and comparing authors’ use of words, this approach allowed us to develop a deep understanding of the literature content (Dixon-Woods, Agarwal, Jones, Young, & Sutton, 2005; Greenhalgh, Macfarlane, Bate & Kyriakidou, 2004, 2005).

**Insert Table 1 here**

### **Establishing trustworthiness**

To establish trustworthiness and meet the criteria of validity and credibility, a number of processes were followed (Harrison, MacGibbon, & Morton, 2001; Sparkes & Smith, 2009).

Firstly, *peer debrief*, which involved a consistent review of the research process by two experienced supervisors, who offered their support and criticisms, was employed (Creswell & Miller, 2000). Peer debrief took place regularly (i.e., every 2-4 weeks) through meetings and informal discussions. Secondly, an *advisory team*, comprised of five external researchers who had previously published studies within the explored literature, was established (Smith, 2010; Weed et al., 2009). The panel was provided with references of included studies, strategies for developing the research question, inclusion and exclusion criteria and a briefing about the purpose of the review. The included papers and research methods employed were approved by the panel and suggestions for additional inclusions provided. After in-depth review of these papers an additional three were included within the review process.

## **Findings**

### **Quantifying the psychological terms used within the reviewed literature**

Across the 21 papers included in this review, 17 different terms were used to describe the array of psychological components said to facilitate talented athletes' development (Table 1, column 1). The terms most frequently used were psychological/psychosocial/mental skills (N authors = 17), psychological/personal/mental characteristics (N authors = 16), psychological/personal factors (N authors = 12), and psychological/personal/mental attributes (N authors = 10). Less frequently used terms were psychological/personal/mental qualities and psychological/cognitive processes (all N authors = 5), psychological/psychosocial competencies, mental toughness attributes/factors/characteristics/subcomponents, psychological characteristics of developing excellence (all N authors = 4), and psychological/mental techniques and strategies (all N authors = 3). By contrast the least frequently used terms were psychological assets, psychological methods, mental preparation, mental or psychological training, life skills, and self-regulation skills (all N authors = 2).

### **Identifying and analysing employed definitions and categories for psychological terms used within the reviewed literature**

One third of authors defined the psychological terms they employed (Table 1, column 4). However, only Holland, Woodcock, Cumming, and Duda (2010) defined and distinguished between different categories of psychological components. They defined psychological qualities as characteristics that facilitated athletes' optimal performance (e.g., robust confidence). In contrast, psychological skills represented athletes' ability to regulate or maintain these psychological qualities. For example, a state of high self-confidence is a

psychological quality an athlete can achieve by using psychological skills as regulatory mechanisms (e.g., maintaining confidence). To develop psychological skills, and in turn impact upon psychological qualities, mental techniques (e.g., imagery) can be employed. Despite not distinguishing between terms themselves, Woodcock, Holland, Duda, and Cumming (2011) refer to Holland et al.'s (2010) definition to establish the purpose of their study. This was to identify psychological qualities considered to be important for the development of youth elite rugby players. Drawing upon the assertions of Weinberg and Gould (2011), Jooste, Van Wyk, and Steyn (2013) defined psychological or mental skills as "...athletes' cognitive abilities and efforts used during sports participation for the purpose of increasing inner satisfaction and enhancing psychological performance standards" (p. 181). In comparison to Holland et al. (2010) it appears that within this definition, no explicit distinction between categories has been established. Instead, it appears that psychological or mental skills have been used as an 'umbrella' term to describe cognitive abilities and efforts. In this instance, an umbrella term can be defined as a term that covers a broad set of 'elemental' psychological components. No additional insight into the meaning of cognitive abilities and efforts has been given, wherefore it can only be assumed that they represent two different psychological components. Despite different terminologies, it appears that authors agree that the end product facilitates athletes' physical performance and development (e.g., psychological skills in Jooste et al.'s case and psychological qualities in Holland et al.'s case). These findings highlight the heterogeneous, and even contradictory, nature of language used by authors researching the same context. It is noteworthy that only one of 21 authors attempted to distinguish between the different types of psychological terms introduced into their text.

Five of the 21 authors defined some of the psychological terms they used. For example, Toering, Elferink-Gemser, Jordet and Visscher (2009) and Jonker, Elferink-Gemser and Visscher (2010) defined self-regulatory skills as the extent to which athletes were proactively, psychologically and behaviourally involved in their own learning process, and identified that these skills increased athletes' likelihood to develop into elite performers. In a similar vein to Jooste et al. (2013), it appears that the term self-regulatory skills has been used as an umbrella term in both studies. It describes athletes' ability to self-monitor, plan, evaluate and reflect, as well as their state of motivation. Despite the first four words describing cognitive activities and the last word a state, no distinctive categorisation is made. Likewise, Jones and Lavalley (2009) defined life skills as 'a range of transferable skills needed for everyday life, by everybody, that help people thrive' (p. 166). They suggested that these consisted of interpersonal skills such as social and family skills, respect and leadership, and personal skills such as self-organisation,

discipline, goal setting, motivation and managing performance outcomes. However, other than a categorisation into interpersonal and personal skills, no further distinction is offered. These examples highlight that even if definitions are offered, the majority lack specificity. This vagueness seems to be underpinned by the use of umbrella terms (e.g., life skills or psychological skills) that do not discriminate the different types of psychological terms. In turn, this could impede the practical implementation and synthesis of findings.

To conclude, only 30% of reviewed studies offered definitions for synonymous terms of psychological components. Despite offering these definitions, the majority were vague and overlapped or contradicted definitions from other sources. Moreover, only one paper distinguished between and categorised different types of psychological terms. However, to effectively implement research results into talent identification and development (TID) models, a clear distinction of concepts is crucial (Danish et al., 2004). In addition, no terminological consistency between studies was identified unless the same or similar authors were included within them. This lack of clarity can create barriers between researchers, academics and practitioners, as it impedes the synthesis, critique and exchange of information, and in turn threatens the development of the research area (Agassi, 2014; Kuhn, 1962; Lindsay et al., 2014; Lourenco, 2001; Swann et al., 2015; Wittgenstein, 1958).

### **Authors' descriptions of psychological terms and insight into possible categorisation**

Due to the limited number of papers that defined psychological terms, a narrative synthesis approach was taken (Swann et al., 2015). The core aim of the inductive thematic analysis was to make sense of the literature by teasing out its meaning through analysing and interpreting authors' vocabulary (Dixon-Woods et al., 2005; Greenhalgh, et al., 2004; 2005). For instance, just over half (N = 12) of the reviewed papers authors explained a) how psychological components are developed (e.g., explicitly taught by coaches), b) what purpose they fulfil (e.g., certain psychological components help to strengthen other psychological components) (Table 1, column 4) or c) gave specific examples (e.g., 'psychological characteristics such as motivation and self-confidence') (Table 1, column 5). This information allows for further interpretation and is analysed in-depth below.

a) *The development of psychological components* - Some authors alluded to how certain psychological components developed, which offers insight into authors' viewpoints (Table 1, column 4). For example, MacNamara et al. (2010b) and MacNamara and Collins (2011) outlined that athletes are predisposed to possess some psychological components, whereas

others need to be systematically taught and practiced. Nevertheless, PCDEs “include both the trait characteristics (i.e., the tendency to...) and the state-deployed skills (i.e., the ability to...when...)” (MacNamara & Collins, 2013, p. 737), wherefore a precise distinction between the different categories cannot be made. In contrast, some authors explained that psychological components such as psychological attributes, factors and characteristics are rather innate but able to be developed over time through the influence of environmental factors and significant others (e.g., family members or coaches) (e.g., Butt et al., 2010; Weinberg & Gould, 2011). Psychological skills and techniques on the other hand were described as dynamic, learned, and not predisposed (e.g., Holland et al., 2010; Larsen et al., 2012). To conclude, some psychological components are trait like. Nevertheless, their levels (e.g., high and low self-confidence) can be developed through the effective use of other psychological components (e.g. goal-setting); indicating a possible distinction of psychological terms into two categories.

*b) The purpose of psychological components* – In 12 of the 17 cases, authors explicitly explained what psychological components allowed athletes to do. For example, the terms psychological characteristics, factors, qualities and attributes, as well as PCDEs (Table 1, column 1, terms 1-4 & 17) were all said to enable athletes’ a) successful development, b) optimal athletic performance, c) manifestation of expertise, d) to fulfil their potential and e) to overcome inevitable hurdles of athletic development (e.g., Holland et al., 2010; Jooste et al., 2013; MacNamara et al., 2010a). In comparison, the terms psychological skills, processes, techniques, and methods, mental preparation, strategies and self-regulatory skills (Table 1, column 1, terms 7-12 & 15) were all described to regulate or enhance the development of the psychological components outlined above (e.g., Connaughton, Hanton, & Jones, 2010; Connaughton, Wadey, Hanton, & Jones, 2008; Durand-Bush & Salmela, 2002; MacNamara et al., 2010a, 2010b). To illustrate, Woodcock et al. (2011) outlined that mental techniques (e.g., self-talk) can regulate or enhance the level of psychological attributes or qualities (e.g., high or low levels of self-confidence). Specifically, a football player could experience low levels of self-confidence after missing a penalty shot, but regulate this feeling by using positive self-talk to increase his self-confidence again. This information again implies a twofold categorisation of psychological components and alludes to a strong relationship between these categories.

*c) Examples of psychological components* - Instead of defining or explaining psychological terms, some authors gave examples (Table 1, column 5) (e.g., Gould et al., 2002; Holt & Dunn, 2004; Mills, Butt, Maynard, & Harwood, 2012; Van Yerpén, 2009). Examples of terms such as psychological characteristics, attributes and qualities (Table 1, terms 1-3) can

be perceived as fairly stable traits. Some common example are motivation, self-confidence, focus, sport intelligence, and discipline (see a full list in Table 1, column 5). In comparison, terms such as psychological processes, techniques, methods, preparation and strategies (Table 1, terms 8-12) were accepted as behaviours athletes can engage in (e.g., goal-setting, reflection, evaluation, self-talk, and imagery).

The above outlined distinction of terms was not always prevalent. Examples given for terms such as life skills, PCDEs or mental toughness (Table 1, terms 4-5, 7, 14-17) often contained a mixture of the above described examples. On the one hand, this could be an indication of authors' dismissal of possible categorical differences in terms (e.g., psychological skills and factors). On the other hand, authors might strive to cluster different categories of psychological terms under one umbrella term to better present the key psychological components that their research has unearthed as particularly important for their researched context (e.g., PCDEs, self-regulation skills, & life skills). According to Jonker et al. (2010) and Toering et al. (2009) the umbrella term 'self-regulatory skills' consist of the elemental psychological components of planning, self-monitoring, evaluation, reflection and effort. In relation to the aims of this research, the development of umbrella terms can be problematic as it may inhibit the reader's understanding of the elemental or underlying components of these umbrella terms and constrain translation into practice.

*Exclusion of constructs.* One core aim of this review was to systematically group, label and define psychological terms used within the reviewed literature. However, as outlined above, certain psychological terms such as PCDEs, life skills, self-regulation skills, and mental toughness appear to form deliberate aggregations of elemental psychological terms. Plausible reasons for these differing aggregations have been highlighted by MacNamara and Collins (2015) in noting that key psychological components of development can “be operationalized differently depending on the individual's age, stage, domain, or performance challenge” (p. 74). As such, divergence may arise as a consequence of researchers' considerations of specific environmental contexts. These aggregations, even though potentially developed to facilitate our understanding of important psychological components in specific contexts, seem to lend themselves to umbrella terms that can impede a specific distinction between different categories of psychological terms. Following this observation, these terms will be excluded from the categorisation and grouping process, however will be considered on the basis of the elemental psychological terms that underpin them.



## **Grouping, labelling and defining clustered psychological terms**

### *Additional evidence to justify grouping, labelling and definitions*

To build an even stronger rationale for the grouping, labelling and clustering of psychological terms, the meaning of each word has been investigated individually based on four different psychological, science and sport medicine dictionaries (Colman, 2008; Kent, 1996, 2006; Reber, 1995) (Table 2). All prefixes (i.e., psychological, mental, cognitive, personal, & psychosocial) were identified to represent something of mental origin that to a certain degree can be innate, but can also be shaped and impacted upon by social and environmental factors (e.g., cultural norms, values, & beliefs). Henceforth, the word psychological is used to represent something of mental origin.

### **Insert Table 2 here**

The suffixes were found to represent two categories, 1) rather innate characteristics and 2) an ability to effectively use psychological behaviours. For example, characteristics (N authors = 15), attributes (N authors = 9), factors and qualities (all N authors = 7) are defined as relatively stable personality traits (Colman, 2008; Kent, 1996, 2006; Reber, 1995). These can be consistent across various situations and represented on a two-dimensional continuum (e.g., motivated - a-motivated). Often, they can be used to explain observed regularities in behaviours (Kent, 1996, 2006; Reber, 1995). In contrast, skills (N authors = 15), processes (N authors = 5), competencies, strategies (all N authors = 4), techniques (N authors = 3), methods, preparation (all N authors = 2), and training (N author = 1), have all been defined as athletes' ability to execute psychological behaviours (e.g., performance routines) (Colman, 2008; Kent, 1996, 2006; Reber, 1995). These behaviours are learned and need to be practiced to be used effectively (Colman, 2008; Kent, 2006). Athletes systematically engage in these behaviours to achieve specific outcomes either immediately (e.g., getting in the zone before a competition) or in the long-term (e.g., develop more self-confidence) (Colman, 2008; Kent, 1996, 2006; Reber, 1995). This indicates a relationship between the categories, whereby the latter (i.e., psychological behaviours) is used to regulate and enhance the former (i.e., personality traits).

### *Group and label any clustered psychological terms*

Having thoroughly analysed each term it is now feasible to group and label synonymous terms. A strong tendency towards a two way categorisation of terms emerged. The first category can be conceptualised of the following terms: psychological processes; techniques;

methods; preparation; skills; and strategies. These terms represent an individual's ability to use learned psychological strategies (e.g., imagery or self-talk) that allow for the regulation or enhancement of more innate psychological components (e.g., self-confidence or motivation). This category does not only refer to athletes' use of psychological strategies, but more importantly is characterised by athletes' ability to retrieve these complex methods effectively at appropriate times. According to Reber (1995, p. 725) skills are "the capacity for carrying out complex, well-organised, patterns of behaviour smoothly and adaptively so as to achieve some end goal" The term 'psychological skills' is therefore perceived to represent this category appropriately. This term has been used frequently in the reviewed literature (N = 15) and appears to be accepted widely within the global sport psychologists', practitioners' and coaches' discourse.

The second category is conceptualized of the following terms: psychological characteristics, attributes, qualities, competencies, and factors. They describe an individual's trait like abilities which are relatively consistent and enduring across a range of situations. They serve an explanatory role for consistently observable behaviours and are said to be the qualities that distinguish elite from non-elite athletes. Despite their robustness, social and contextual influences can impact upon their development. At the same time the use of psychological skills can regulate and facilitate the enhancement of these components. According to Reber (1995, pp. 120-121) characteristics are "individualistic feature, attribute, etc. that serves to identify and 'characterize' something. Generally used synonymously with trait in discussions of personality." The term 'psychological characteristic' is therefore perceived to represent this category appropriately. This term has been used frequently within the analysed literature (N = 15) and is commonly used within the international sport psychology discourse. Figure 1 below illustrates the categorisation of the different terms into psychological skills and characteristics and outlines their relationship to each other.

**Insert Figure 2 here**

## **Discussion**

This review aimed to address calls for greater clarity of psychological terms used within the talent development literature (e.g., Gould & Carson, 2008; Lindsay et al., 2014; Racine & Müller, 2009). More specifically, it aimed to (i) identify terms used to describe psychological components that are perceived to facilitate talented athletes' development; (ii) locate and analyse definitions and descriptions of these terms in order to clarify consistencies and

inconsistencies in meaning; and (iii) group, label and define any clustered psychological terms. The purpose of the review was not to critique the quality of research, but to draw upon the exposed thinking of renowned philosophers such as Wittgenstein (1953), Kuhn (1962) or Popper (1962) to inform debate and discussion in another research area (Racine & Müller, 2009). A purposeful, bold and necessary imperfect theory about the terms used within the literature has been created that can be tested, critiqued and improved upon through critical debate and research. It is envisaged that this process will offer an opportunity for progression and development by allowing for more critical discussions and easier exchange of information within the sport psychology field. This review offers an opportunity to take a step back and consider the arguably dysfunctional use of key terms. In doing so, it once again calls the field to action and underscores the omnipresent need to act upon Vealey's 30-year old conclusions.

This review identified inconsistencies in language use within the talent development literature. Only Holland et al. (2010) define and distinguish different types of psychological terms. According to Wittgenstein (1953) and Lourenco (2001), this can inhibit researchers' and authors' ability to effectively build upon, relate to and critique each other, and obscures practitioners' and TID systems' capacity to fully understand how to implement findings into everyday practise. Further, authors tended to work in paradigms in which fundamental assumptions, beliefs and a specific set of language were shared (Kuhn, 1962). Thereby, terms were only consistent if an author was involved in more than one of the reviewed papers. This obscures clarity and aggravates readers' ability to compare and critically evaluate key messages. This could have troublesome effects on neophyte practitioners and researchers and hinder the practical implementation of findings. As alluded to by Reber (1995) and Popper (1978), findings also identified that authors often dismissed their responsibility to clearly explain topic specific vocabulary. Given the worldwide impact of talent development research it is important to clarify such vocabulary because despite the widespread use of the English language, terms are often interpreted differently depending on the context in which they are applied. To be able to exchange and transmit our knowledge more effectively, work in collaboration and drive the development of our subject area forwards, it is important to express ourselves clearly. Finally, it was noticed that authors introduced umbrella terms such as life skills, mental toughness, PCDEs, mindset and self-regulatory skills. Despite this being a valuable attempt to summarise and perhaps consider context specific differences in the development and deployment of important psychological components (MacNamara & Collins, 2015), it perhaps adds an additional layer of complexity to the prevailing definitional issue. In

turn, this might hinder the readers' ability to understand how these psychological components can be achieved. This review strived to bring conceptual clarity into the reviewed literature by analysing, synthesising and interpreting the meaning of commonly used psychological terms. Findings indicated that the psychological terms can be distinguished into two different categories, namely psychological skills and characteristics, which can be defined as follows:

### **Psychological Characteristics**

Psychological characteristics pertain to qualities of the mind (Colman, 2008; Kent, 2006; Reber, 1995). To a certain degree, they are innate predispositions or personality traits (Kent, 1996; Reber, 1995). Nevertheless, social and contextual (e.g., athletes' performance domain or age/stage of development) influences, as well as performance challenges experienced by athletes, may strongly impact upon their development and operationalization (Henriksen, Stambulova, & Roessler, 2010; Larsen et al., 2012; Wynn & Williams, 2012; MacNamara & Collins, 2015). Psychological characteristics serve an explanatory role for individual differences in consistently observable behaviours (e.g., choking under pressure) (Reber, 1995) and distinguish individuals' behaviours from each other as they influence and determine physical behaviours (Colman, 2008; Reber, 1995). They are relatively stable, enduring and consistent across a wide range of situations (Kent, 1996, 2006), but can, just like physical skills, be enhanced or strengthened through systematic development and training (Holland et al., 2010; Larsen et al., 2012; MacNamara & Collins, 2011; Weinberg & Gould, 2011). Psychological characteristics can be represented as a two-dimensional continuum (e.g., determined-non-determined) on which individuals can move and be measured on (Kent, 2006).

The sport psychological literature describes psychological characteristics as the qualities that distinguish elite from non-elite athletes (Abbott & Collins, 2002) and that facilitate optimal performance states (Holland et al., 2010). They are said to enable effective talent development by allowing athletes to negotiate the inevitable challenges of talent development (e.g., transitions), engage effectively with developmental opportunities (e.g., learning opportunities), and by providing individuals with competencies to fulfil their potential (MacNamara et al., 2010a, 2010b). Well-developed psychological characteristics help athletes to stay committed and facilitate behaviours that underpin effective learning and development (Gould et al., 2002; MacNamara et al., 2010a, 2010b). They are said to increase talented athletes' likelihood to develop into elites, whereas in the absence of these characteristics they are likely to fail at some stage of their development (MacNamara & Collins, 2011). A common method used to strengthen or develop psychological characteristics is the use of psychological

skills (e.g., imagery, goal-setting, relaxation) (Holland et al., 2010; MacNamara & Collins, 2011).

### **Psychological Skills**

Psychological skills are pertaining to skills of the mind (Colman, 2008; Kent, 2006; Reber, 1995). They represent an individuals' ability to use learned strategies to accomplish specific results (e.g., the ability to reflect on a piece of work to make it better) (Kent 2006; Reber, 1995). Within the reviewed literature, psychological skills are used to regulate or enhance psychological characteristics either immediately (e.g., getting in the zone before a match) or over time (e.g., building confidence) (Holland et al., 2010; Larsen et al., 2012; MacNamara & Collins, 2011; Reber, 1995; Weinberg & Gould, 2011). Being able to use and retrieve the complex psychological strategies effectively at appropriate times makes it a skill that athletes can acquire through systematic long-term practice (Kent, 2006). Psychological skills are taught explicitly or implicitly by the context an individual lives in (Henriksen et al., 2010; Larsen et al., 2012) and they can be used individually or in combination depending on individual needs (Larsen et al., 2012, MacNamara & Collins, 2015).

Aspiring to Popper who believed that 'truth emerges quicker from error than from confusion' (Agassi, 2014, p. 93), these definitions are anything but set in stone. They are open to discussion and will be further developed through debate and critique. The definitions were developed based on information elicited from included studies. It is envisioned that these findings can foster communication between researchers, academics, practitioners, coaches and athletes, and help bridge the gap between theory and practice. After all, research conducted in TID environments should not be hidden away in books, as it is a shared goal to make a positive contribution to applied practices, i.e., improve coaching practice, as well as the performance and well-being of athletes and coaches. For this to be achievable, findings need to be applicable and more importantly communicated clearly. Therefore, it is recommended to use, or at least consider, the definitions and arguments raised in this review.

### **Strength and Limitations**

This systematic review has three main strengths. Firstly, it addresses calls from various researchers in the field – and beyond - for explicit definitions of psychological terms. Referring back to Wittgenstein, Popper and Kuhn it has been highlighted that a lack of clear definitions can curtail the development of high quality, scientific research. Secondly, rigorous inclusion and exclusion criteria were employed, which allowed for a broad range of recent empirical

studies to be reviewed. Finally, this review has led to a categorisation and distinction of psychological skills and characteristics. Despite these findings being open to debate, it is hoped that they will stimulate careful consideration of the issues raised, and in doing so effect change.

Balanced against these strengths, limitations of this review can be acknowledged. Despite the focus of the review being on defining salient psychological terms of the sport psychological literature, studies included focused only on the psychological skills and characteristics of young talented athletes. To make the established definitions more rigorous, a wider range of literature could be reviewed. Secondly, explicit definitions and categorisations of psychological terms were limited, wherefore the developed definitions are strongly based on a narrative interpretive approach. To increase the reliability of these interpretations, it might be beneficial to talk to authors more directly to fully understand their standpoints.

## **Conclusion**

The sport psychological literature is a fast growing endeavour that impacts on policies and curriculum design in TID systems. Due to this worldwide impact, it is important that authors consider their transmission of information. Paying attention to our use of language can promote better scientific activity. In conducting this systematic review, it is hoped that authors and researchers do not feel defensive, but instead encouraged to consider their use of language. This review is not an appeal to precise and single meanings of concepts or words. Rather it is an appeal to consider if the words we use make good sense in the context we are using them, if they are transparent and if in doubt clear definitions are being stated. The aim of this paper was to open the floor to scientific debate and invite empirical refinement and comments from colleagues within and outside the field of sport psychology.

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**Table 1.** Combination, definition, meaning and examples of psychological terms used by a number of authors (N) within the included studies.

Combinations of psychological terms used within reviewed literature	N out of 21 papers	Authors	Definitions and <i>implied definitions</i> offered within the literature (author(s))	Examples
<b>1) Psychological or Personal or Mental Characteristics</b>	16	Butt et al., (2010); Durand-Bush & Salmela (2002); Connaughton et al., (2008); Gould et al., (2002); Holland et al., (2010); Harwood (2008); Holt & Dunn (2004); Jooste et al., (2013); Kruger et al., (2012); Larsen et al., (2012); MacNamara et al., (2010a), (2010b); Weinberg et al., (2011); Woodcock et al., (2011)	<p><i>"...psychological characteristics (e.g., commitment, motivation, determination) facilitated the development of elite classical and non-classical musicians." (MacNamara et al., 2010a, p.53)</i></p> <p><i>"... psychological characteristics play a central role, and are necessary for both the acquisition and manifestation of expertise" (MacNamara et al., 2010a, p. 53)</i></p> <p><i>"...displayed by athletes that facilitate optimal performance." (Holland et al., 2010, p.20)</i></p> <p><i>"...developed over time and are influenced by a variety of environmental factors and significant others..." (Weinberg et al., 2011, p.158)</i></p>	e.g., self-confidence, motivation, commitment, determination, mental toughness, enjoyment, responsibility, adaptability, squad spirit, self-aware learner, optimal performance state, game sense, attentional focus, viewing difficult situations as challenging and exciting, adaptive perfectionism, positive mindset, discipline, coping skills, optimism, hope, sport intelligence, willingness to sacrifice, competitiveness, perseverance, creativity, innovative, highly independent, hard-work ethic, maintaining a sense of balance, leadership, open-mindedness
<b>2) Psychological or Personal or Mental Attributes</b>	11	Butt et al., (2010); Connaughton et al., (2008); Cook et al. (2014) Durand-Bush & Salmela, (2002); Gould et al., (2002); Holland et al., (2010); Jooste et al., (2013); MacNamara et al., (2010a); Mills et al. (2012); Weinberg et al., (2011); Woodcock et al., (2011)	<p><i>"Psychological attributes were highlighted as a, if not the, crucial factor underpinning successful development." (MacNamara et al., 2010a, p.62)</i></p> <p><i>"...can be influenced through the employment of specific techniques (e.g., positive self-talk)" (Woodcock et al., 2011, p.412)</i></p>	e.g., self-confidence, motivation, competitiveness, high independence, striving to learn and improve, performing under pressure, hard-work ethic, anticipation, mental toughness, task focus
<b>3) Psychological or Mental or Personal Qualities</b>	5	Connaughton et al., (2008); Harwood (2008); Holland et al., (2010); Jooste et al., (2013); Woodcock et al., (2011)	<p><i>"Mental qualities are psychological characteristics displayed by athletes that facilitate optimal performance (e.g., robust confidence, appropriate attentional focus)" (Holland et al., 2010, p.20)</i></p> <p><i>"... associated with optimal development in young athletes ..." (Holland et al., 2010, p. 20)</i></p> <p><i>"...perceived to be necessary to acquire expertise and optimize their athletic development..." (Holland et al., 2010, p.21)</i></p> <p><i>".., a state of high self-confidence is a quality to be attained" (Holland et al., 2010, p.20)</i></p> <p><i>"The consequence of having confidence resulting from these skills was considered a quality... These</i></p>	e.g., enjoyment, responsibility, adaptability, squad spirit, self-aware learner, determination, confidence, optimal performance state, game sense, attentional focus, mental toughness, viewing difficult situations as challenging and exciting, adaptive perfectionism, positive mindset, commitment, discipline, coping skills, competitive, optimism, sport intelligence, willingness to sacrifice

			qualities may be experienced at differing levels (e.g., high and low self-confidence), and are psychological attributes that can be influenced through the employment of specific techniques (e.g., positive self-talk)" (Woodcock et al., 2011, p.412)	
<b>4) Psychological or Personal Factors</b>	13	Connaughton et al., (2008); Cook et al. (2014); Durand-Bush & Salmela (2002); Jooste et al., (2013), Kruger et al., (2012); MacNamara et al., (2010a), (2010b); Mills et al., (2012); Van Yperen, (2009), Woodcock et al., (2011)	<p><i>"Considerable research evidence attests to the role of psychological factors as determinants of elite performance."</i> (MacNamara et al., 2010a, p. 52)</p> <p><i>"...play a crucial role in determining the developmental capacity of an individual."</i> (MacNamara et al., 2010a, p.70)</p> <p><i>"...play a fundamental role in establishing the development capacity of an individual as well as facilitating the transforming of potential into talent."</i> (Jooste et al., 2013, p.181)</p> <p><i>"...necessary for the attainment of excellence by facilitating the acquisition of skills and enabling athletes to invest the requisite time to practice and stay committed to the development process."</i> (MacNamara et al., 2010a, p.53)</p> <p><i>"...facilitated the translation of potential into talent."</i> (MacNamara et al., 2010a, p. 70)</p> <p><i>"These psychological factors (e.g., imagery) allowed the aspiring elites to cope with the unique pressures associated with performing in novel environments (Ceci, Barnett, &amp; Kanaya, 2003) by optimizing development opportunities (e.g., first time appearances at a new level of competition), and effectively negotiating the transitions (e.g., selection onto teams) encountered along the pathway to excellence."</i> (MacNamara et al., 2010, p. 68)</p>	e.g., commitment, goal-setting, imagery, focus, determination, persistence, motivation, autonomy, problem-focused coping behaviours, social support seeking
<b>5) Psychosocial/Psychological Competencies</b>	4	Harwood (2008); Holt & Dunn (2004); Larsen et al., (2012); Mills et al. (2012)	N/A	e.g., discipline, commitment, resilience, social support, goal-setting, emotional control, self-esteem, hard-work ethic, communication, social skills
<b>6) Psychological Assets</b>	2	Harwood (2008); Larsen et al., (2012)	N/A	N/A
<b>7) Psychological or Psychosocial or Mental Skills</b>	18	Butt et al., (2010); Cook et al. (2014); Durand-Bush & Salmela (2002); Connaughton et al., (2008); Connaughton et al., (2010); Gould et al., (2002); Harwood (2008); Holland et al., (2010); Jooste et al., (2013); Kruger et al., (2012); Larsen et al., (2012); MacNamara et al., (2010a),	<p>"Mental skills also referred to as psychological skills- are defined as athletes' cognitive abilities and efforts used during sports participation for the purpose of increasing inner satisfaction and enhance physical performance standards (Weinberg and Gould, 2011)" (Jooste et al., 2013, p.181)</p> <p>"Skills were considered as qualities to be attained (e.g., having confidence) ..." (Woodcock et al., 2011, p.412)</p> <p>"..., skills were deemed to represent a regulatory capability such as an athlete's ability to facilitate and maintain levels of confidence." (Woodcock et al., 2011, p.412)</p> <p><i>"...mental skills are noted to be among the foremost prerequisites for peak performance in professional and collegiate golfers (Cohn, 1991). They also constitute key antecedents of</i></p>	e.g., commitment, imagery, coping skills, goal-setting, self-regulating optimal arousal, focus, confidence, knowledge, mental planning, motivation, concentration ability, coachability, peaking under pressure, self-awareness, hard-work ethic, the ability to utilize social skills, managing performance and process outcomes

		<p>(2010b), Weinberg et al., (2011); Woodcock et al., (2011)</p>	<p><i>performance excellence in internationally renowned classical musicians (Talbot-Honeck &amp; Orlick, 1998) and the maintenance of expert performance in kick-boxers (Devonport, 2006)."</i> (Jooste et al., 2013, p. 181)</p> <p><i>"...mental skills (e.g., maintaining confidence, refocusing) regulate mental qualities..."</i> (Holland et al., 2010, p.20)</p> <p><i>"...once acquired, mental toughness needed to be maintained with a variety of psychological skills."</i> (Connaughton et al, 2010, p. 170)</p> <p><i>"In terms of maintaining mental toughness, findings indicated that once it had been developed, a desire and a motivation to succeed, a support network, and the use of psychological skills were three underlying mechanisms important in maintaining it."</i> (Butt et al., 2010, p. 318)</p> <p><i>"...advanced mental skills was reported to help retain mental toughness."</i> (Connaughton et al., 2008, p. 94)</p> <p><i>"...psychological skills to maintain facilitative interpretations of the competitive anxiety response..."</i> (Connaughton et al., 2008, p. 94)</p> <p><i>"The skill is the capability to regulate and maintain that self-confidence..."</i> (Holland et al., 2010, p.20)</p> <p><i>"From an ecological perspective it makes no sense to perceive psychosocial skills or coping strategies as inner, independent and stable personalities. Instead, psychosocial skills are perceived as socially constructed, culturally contingent, and highly dependent on the specific environmental conditions. (Larsen et al., 2012, p. 53)</i></p> <p><i>"...psychological skills are a key factor for coping in future transitions."</i> (Larsen et al., 2012, p. 52)</p> <p><i>"...a key determinant in the talent development process."</i> (Larsen et al., 2012, p. 52)</p>	
<b>8) Psychological or Cognitive Processes</b>	5	<p>Durand-Bush &amp; Salmela (2002); MacNamara et al., (2010a), (2010b); MacNamara &amp; Collins, (2013)</p>	<p><i>"...the employment of psychological processes (e.g., goal setting, planning, performance evaluation) can help athletes improve maximally from practice."</i> (MacNamara et al., 2010a, p.70)</p> <p><i>"...the role of psychological processes in coping with the unique pressures of 'staying there'..."</i> (MacNamara et al., 2010a, p.68)</p> <p><i>"The perceived importance of psychological processes in successfully remaining at the top of one's sport..."</i> (MacNamara et al., 2010a, p.68)</p> <p><i>"Whether the athletes were consciously doing it or not, they engaged in elaborate cognitive processes that enabled them to visualize, focus, and develop an acute sense of awareness of their environment."</i> (Durand-Bush &amp; Salmela, 2002, p. 160)</p>	<p>e.g. goal-setting, planning, performance evaluation, self-reflection</p>

<b>9) Psychological or Mental Techniques</b>	3	Holland et al., (2010); Woodcock et al., (2011)	<p>Mental techniques are employed to develop mental skills: "...that regulate those mental qualities, and the mental techniques (e.g., self-talk, relaxation), employed to develop those skills. (Holland et al., 2010, p. 20)</p> <p><i>"When regulating their mental qualities, these young athletes referred to a broad range of mental techniques employed in training and competition." (Holland et al., 2010, p. 29)</i></p> <p><i>"...the techniques discussed can be considered intuitively developed strategies related to the sport demands and environmental structures placed upon them." (Holland et al., 2010, p. 29)</i></p> <p><i>The employment of mental techniques can influence psychological qualities/attributes (Woodcock et al., 2011, 412)</i></p>	e.g., personal performance strategies (e.g., relaxation, routines, self-talk, visualization), reflection on action, taking advantage of a supportive climate, team-based strategies
<b>10) Psychological Methods</b>	2	Woodcock et al., (2011)	"..., whereas methods were techniques adopted by athletes to develop desired skills (e.g., positive self-talk)." Woodcock et al., 2011, p.412	e.g., goal-setting, imagery, physical relaxation, thought control
<b>11) Mental Preparation</b>	2	Connaughton et al., (2008); Durand-Bush & Salmela, (2002)	<p><i>"Mental preparation was also important and involved imagery, positive thinking, awareness, and goal-setting." (Durand-Bush &amp; Salmela, 2002, p. 163)</i></p> <p><i>"In addition to deliberate practice, mental preparation was quite important during both the investment and maintenance years, and interestingly, did not always involve formal and structured sessions." (Durand-Bush &amp; Salmela, 2002, p. 167)</i></p>	e.g., imagery, positive thinking, awareness, goal-setting, self-talk, reflection
<b>12) Strategies</b>	3	Connaughton et al., (2008); Gould et al., (2002); Durand-Bush & Salmela (2002); Weinberg et al., (2011)	<p><i>"Personal performance strategies are individualized mental techniques employed by athletes to cope with pressure and optimize their performance state." (Holland et al., 2010, p. 290)</i></p> <p><i>"Imagery, relaxation, and self-talk were strategies that the athletes used to get into an optimal state for their event." (Durand-Bush &amp; Salmela, 2002, p. 161)</i></p> <p><i>"Self-talk and visualization were among several strategies the athletes used to regulate their level of intensity and to deal with excessive pressure and demands associated with high-level competition." (Durand-Bush &amp; Salmela, 2002, p. 165)</i></p> <p><i>"Strategies were perceived to strengthen or develop mental toughness attributes" (Connaughton et al., 2008, p. 91)</i></p> <p><i>"...strategies used to develop and maintain facilitative interpretations of competitive anxiety-related symptoms." Connaughton et al., 2008, p. 84)</i></p>	e.g., imagery, self-talk, relaxation, visualization, goal-setting, keeping things in perspective
<b>13) Mental or Psychological Training</b>	2	Durand-Bush & Salmela (2002)	N/A	N/A
<b>14) Life Skills</b>	2	Jones & Lavalley (2009); Larsen et al., (2012);	"..., a new participant-centered definition of life skills as ranges of transferable skills needed for everyday life, by everyone, that help people thrive was developed." (Jones & Lavalley, 2009, p.166)	e.g., interpersonal skills (social skills, respect, leadership, family interaction, and



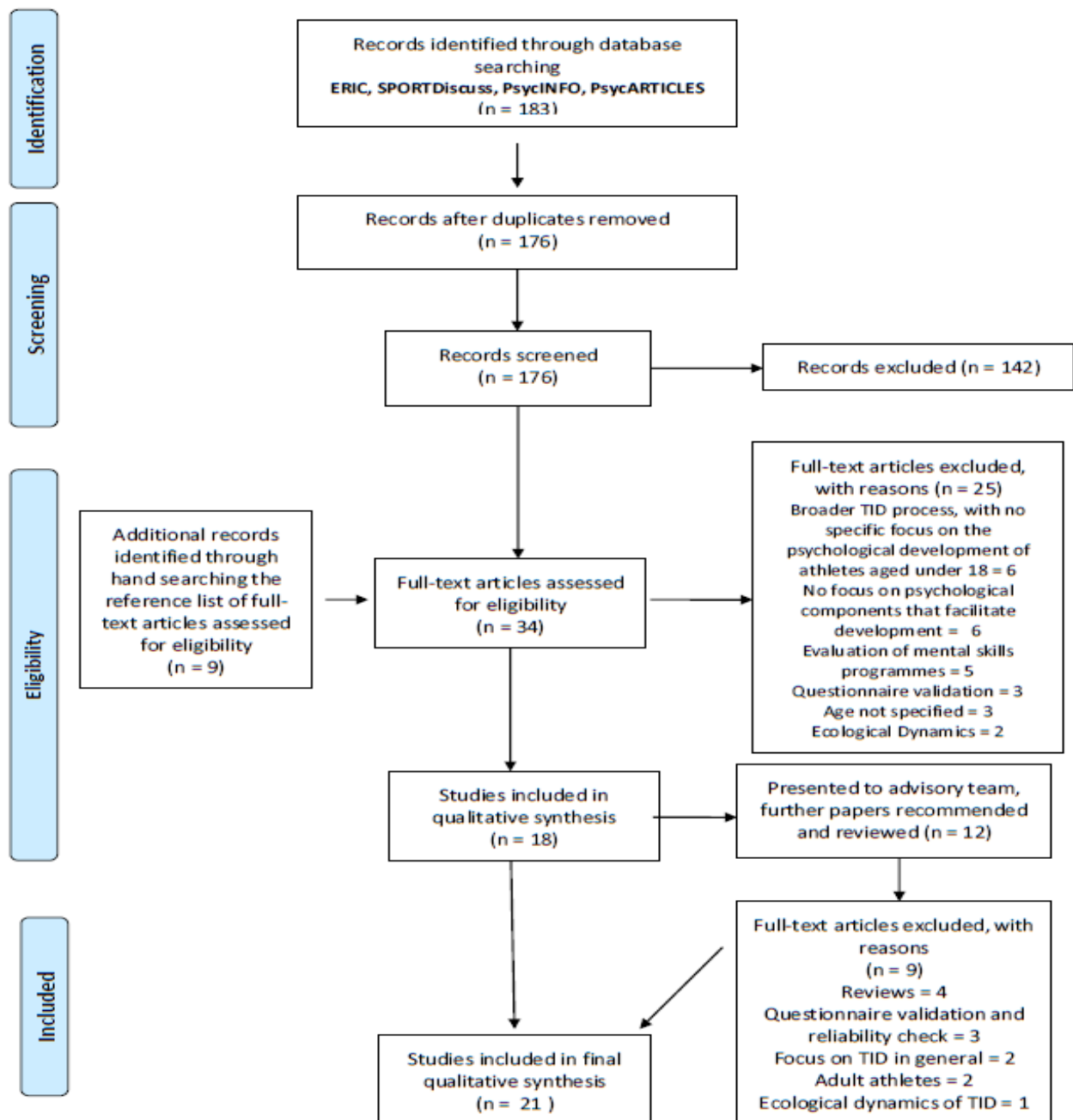
		Woodcock et al., (2011)	<p>"The World Health Organization (WHO,1999) defines life skills as the ability for adaptive and positive behaviour that enables individuals to deal effectively with the demands and challenges of everyday life. Life skills can be physical (e.g., proper posture), behavioural (e.g., effective communication), or cognitive (e.g., effective decision making)." (Jones &amp; Lavallee, 2009, p. 159)</p>	communication); personal skills (self-organisation, discipline, self-reliance, goal-setting, managing performance outcomes, motivation), overcoming obstacles, positive thinking
<b>15) Self-Regulatory Skills</b>	2	Toering et al., (2009); Jonker et al., (2010)	<p>"The extent to which individuals are metacognitively, motivationally, and behaviourally proactive participants in their own learning." (Toering et al., 2009, p. 1509)</p> <p>"Self-regulation is the extent to which learners exert control over their own learning to master a specific task and to improve." (Jonker et al., 2010, p. 901)</p>	e.g., planning, self-monitoring, evaluation, reflection, effort, self-efficacy
<b>16) Mental Toughness Attributes, Factors, Characteristics or Subcomponents</b>	5	Butt et al., (2010); Connaughton et al., (2008); Connaughton et al., (2010); Cook et al. (2014); Weinberg et al., (2011)	<p><i>"Thus, it appears that in addition to genetics playing a role in the development of any attribute, the importance of environmental influences in building mental toughness earlier in athletes' playing careers is definitely important. (But et al., 2010, p. 319)</i></p> <p><i>"In keeping with the idea that mental toughness factors, like other psychological skills, are developed over a long period of time, ..."</i> (Butt et al., 2010, p. 318)</p> <p><i>"Findings indicated that mental toughness attributes generally developed throughout their career stages and involved a large number of perceived underlying mechanisms."</i> (Butt et al., 2010, p.318)</p> <p><i>"The acknowledgment that mental toughness attributes could be acquired..."</i> (Connaughton et al., 2010, p. 169)</p> <p><i>"Mental toughness has been reported to be the most important psychological characteristic in achieving performance excellence"</i> (Connaughton et al., 2008, p. 83)</p>	e.g., belief, focus, goal-setting, pushing yourself to the limit, self-regulation, awareness and control of thoughts, coping ability, motivation, resilience, anticipation skills, hard-work ethic, performing under pressure
<b>17) Psychological Characteristics of Developing Excellence (PCDEs)</b>	4	Jooste et al., 2013; MacNamara et al., (2010a); (2010b)	<p>Summary of key messages from within MacNamara et al., ( 2010a, b):</p> <ul style="list-style-type: none"> <li>• <i>Contribute to the conversion of athletes' potential into elite achievement.</i></li> <li>• <i>Facilitate athletes' capacity to make the most out of their innate abilities.</i></li> <li>• <i>Needed to negotiate the inevitable challenges of talent development (e.g., injury, transitions, selection).</i></li> <li>• <i>Allow athletes to optimize developmental opportunities, adapt to setbacks, effectively negotiate key transitions, stay on the pathway to excellence, invest the requisite time to practice and learn effectively.</i></li> <li>• <i>Account for considerable variance in development efficacy.</i></li> <li>• <i>Includes mental skills, as well as attitudes, behaviours and characteristics.</i></li> <li>• <i>Include both the trait characteristics (the tendency to...) and the state-deployed skills (the ability to...when...).</i></li> <li>• <i>Some of the PCDEs athletes possess and some need to be systematically developed.</i></li> </ul>	e.g. commitment to excelling in sport, coping under pressure, self-belief, vision of what it takes to succeed, imagery, distraction and focus control, social skills, goal-setting, realistic performance evaluation, competitiveness, game awareness, importance of working on weaknesses

**Table 2:** Psychological terms used by a number of authors (N) of included studies and definitions offered by psychological, medical and science dictionaries.

Psychological terms	N	Authors who used this term	Dictionary Meaning (author(s))
1) <b>psychological</b>	16	Butt et al., (2010); Connaughton et al., (2008); Connaughton et al., (2010); Cook et al., (2014); Gould et al., (2002); Harwood (2008); Holland et al., (2010); Holt & Dunn, (2004); Jooste et al., (2013); Kruger et al., (2012); Larsen et al., (2012); MacNamara et al. (2010a, b); Van Yperen (2009); Weinberg et al., (2011); Woodcock et al., (2011)	<ul style="list-style-type: none"> <li>Things of mental origin (Reber, 1995)</li> </ul>
2) <b>mental</b>	7	Butt et al., (2010); Durand-Bush & Salmela (2002); Connaughton et al., (2008); Connaughton et al., (2010); Gould et al., (2002); Holland et al., (2010); Jooste et al., (2013);	<ul style="list-style-type: none"> <li>Pertaining to the mind (Reber, 1995; Kent, 1996; 2007)</li> </ul>
3) <b>cognitive</b>	2	Durand-Bush & Salmela (2002); Jooste et al., (2013)	<ul style="list-style-type: none"> <li>Thought processes such as thinking, reasoning, remembering (Reber, 1995, Kent, 1996; 2007; Colman, 2008))</li> <li>Any class of mental activity (Reber, 1995, Colman, 2008)</li> <li>Internal, mental processes (Reber, 1995, Kent 1996; 2007)</li> </ul>
4) <b>personal</b>	3	Durand-Bush & Salmela (2002); Connaughton et al., (2008); Jones & Lavallee, (2008)	<ul style="list-style-type: none"> <li>A characteristic that is intrinsic to an individual (Reber, 1995)</li> </ul>
5) <b>psychosocial</b>	2	Holt & Dunn, (2004); Larsen et al., (2012)	<ul style="list-style-type: none"> <li>Any situation in which both psychological and social factors are assumed to impact (Reber, 1995)</li> <li>Stresses the interaction between the person and its environment (Reber, 1995)</li> </ul>
6) <b>attribute</b>	10	Butt et al., (2010); Connaughton et al., (2008); Connaughton et al., (2010); Cook et al., (2014); Jooste et al., (2013); MacNamara et al. (2010a, b); Mills et al. (2012); Weinberg et al., (2011); Woodcock et al., (2011)	<ul style="list-style-type: none"> <li>Elementary or fundamental quality (Reber, 1995, Colman, 2008)</li> <li>Relatively stable (Reber, 1995)</li> <li>A defining physical or psychological characteristic or trait of something/someone (Reber, 1995; Kent, 1996; 2007)</li> </ul>
7) <b>characteristic</b>	13	Butt et al., (2010); Durand-Bush & Salmela (2002); Connaughton et al., (2008); Connaughton et al., (2010); Gould et al., (2002); Harwood (2008); Holland et al., (2010); Holt & Dunn, (2004); Jooste et al., (2013); Kruger et al., (2012); Larsen et al., (2012); MacNamara et al. (2010a, b)	<ul style="list-style-type: none"> <li>An individual attribute that serves to identify, characterize or distinguish something/someone (Reber, 1995, Colman, 2008)</li> <li>When exploring personality, often used synonymously with the word trait; describes an aspect of an individual's personality (Reber, 1995, Kent 1996)</li> <li>Enduring; relatively stable predisposition; consistent across various different situations (Reber, 1995, Kent, 1996; 2007)</li> <li>Often explains observed regularities and consistencies in individuals behaviours (Reber, 1995; Kent, 1996; 2007)</li> <li>Usually representable on a two-dimensional construct (e.g., motivated-a-motivated)</li> </ul>
8) <b>quality</b>	7	Connaughton et al., (2008); Harwood (2008); Holland et al., (2010); Holt & Dunn, (2004); Jooste et al., (2013); Woodcock et al., (2011)	<ul style="list-style-type: none"> <li>An aspect or characteristic of someone/something that enables it/him/her to be distinguished from others (Reber, 1995)</li> </ul>

<b>9) assets</b>	2	Harwood (2008); Larsen et al., (2012)	N/A
<b>10) factor</b>	7	Cook et al., (2014); Durand-Bush & Salmela (2002); Kruger et al., (2012); MacNamara et al. (2010a, b); Mills et al. (2012); Van Yperen (2009)	<ul style="list-style-type: none"> <li>• Something that has a causal influence on a phenomenon (Reber, 1995)</li> <li>• A component, constituent part, or condition that contributes to something (Kent, 1996; 2007; Colman, 2008)</li> </ul>
<b>11) skill</b>	14	Butt et al., (2010); Durand-Bush & Salmela (2002); Connaughton et al., (2008); Connaughton et al., (2010); Cook et al., (2014); Gould et al., (2002); Harwood (2008); Holland et al., (2010); Jones & Lavallee, (2008); Jooste et al., (2013); Kruger et al., (2012); Larsen et al., (2012); Weinberg et al., (2011); Woodcock et al., (2011)	<ul style="list-style-type: none"> <li>• The ability to carry out complex patterns of behaviour that will lead to the achievement of a specific goal (Reber, 1995; Colman, 2008)</li> <li>• Its effective execution is dependent on practice and experience (Kent, 2007; Colman, 2008)</li> <li>• It is a learned behaviour as opposed to it being innate or predisposed. (Kent, 2007; Colman, 2008)</li> <li>• (cognitive skill) Learned techniques designed to change levels of anxiety, arousal, and attention using processes such as imagery (Kent, 1996; 2007)</li> </ul>
<b>12) competency</b>	4	Harwood (2008); Holt & Dunn, (2004); Larsen et al., (2012); Mills et al. (2012)	<ul style="list-style-type: none"> <li>• (competence) The ability to perform a certain skill or achieve a desired outcome (Reber, 1995; Kent 1996; 2007)</li> <li>• (competence) The scope of someones ability (Colman, 2008)</li> </ul>
<b>13) technique</b>	2	Holland et al., (2010); Woodcock et al., (2011)	<ul style="list-style-type: none"> <li>• Specifically learned (sets of) procedures that aim to achieve a certain outcome (Reber, 1995)</li> <li>• Often fairly complex wherefore they need to be practiced to be used effectively (Reber, 1995)</li> <li>• Very similar to methods and procedures (Reber, 1995)</li> <li>• An integral part of a skill (Kent, 1996; 2007)</li> </ul>
<b>14) process</b>	3	Durand-Bush & Salmela (2002); MacNamara et al. (2010a, b)	<ul style="list-style-type: none"> <li>• A series of active behaviours aimed to achieve a certain goal (Reber, 1995)</li> <li>• Systematic use of it can cause relatively stable characteristics to change (Reber, 1995)</li> </ul>
<b>15) method</b>	1	Woodcock et al., (2011)	<ul style="list-style-type: none"> <li>• Engaging in a behaviour in a systematic fashion (Reber, 1995)</li> </ul>
<b>16) preparation</b>	2	Durand-Bush & Salmela (2002); Connaughton et al., (2008);	<ul style="list-style-type: none"> <li>• The act of getting ready to perform certain behaviours (Reber, 1995)</li> <li>• (mental preparation) Mental procedures, acquired through systematic mental training, which are aimed at facilitating an individual's ability to achieve an ideal performance state (Kent, 2007)</li> <li>• (psychological preparation) Mental preparation in which athletes learn how to deal with psychological stressors and achieve an optimal level of arousal to perform at the best of their ability (Kent, 1996)</li> </ul>
<b>17) training</b>	1	Durand-Bush & Salmela (2002)	<ul style="list-style-type: none"> <li>• Any specific instructional program or procedures aimed at achieving a particular outcome (Reber, 1995)</li> <li>• (mental training) Systematic, long-term developmental training of mental skills that enable athletes to perform to the best of their abilities at competitions (Kent, 2007)</li> </ul>
<b>18) strategy</b>	3	Durand-Bush & Salmela (2002); Connaughton et al., (2008); Connaughton et al., (2010)	<ul style="list-style-type: none"> <li>• A consciously derived plan of action that is aimed at achieving a certain result (Reber, 1995)</li> <li>• (cognitive strategies) Psychological procedures aimed at controlling anxiety and improving athletes performance (Kent, 1996; 2007)</li> </ul>

**Figure 1:** Flow diagram of study selection



**Figure 2:** Grouping, synthesis and labelling of key psychological terms and their relationship to each other

